

ABSTRACT OF THE DISCLOSURE

A transceiver employing a steerable phased-array antenna includes a modem architecture in which signals from each antenna element in the array are independently processed down to the individual baseband channel level, and digital beamforming is performed at baseband. The data rate reduction from IF to baseband permits parallel signal data from multiple antenna elements to be time multiplexed and serially processed at acceptable data rates at baseband with minimal modem hardware requirements. Both for transmit signal modulation and received signal demodulation, the computation of carrier tracking, automatic gain control (AGC)/power-control, and beamforming are shared by the same processing circuitry for all channels when performed at baseband. The resulting baseband circuitry is only incrementally larger than that required for carrier tracking and AGC alone, yet accomplishes independent beamforming for each antenna element on each user channel.